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EDITORIAL.

Agricultural Education in Malaya.

The account, which appears on another page of this issue, of the annual prize distribution at the School of Agriculture, Malaya, serves to draw attention to the important subject of agricultural education in Malaya.

In the minds of the public, agricultural education in this country implies the training of Asiatics for salaried posts in the Department of Agriculture and the Rubber Research Institute; the fitting of Asiatics for more responsible posts on estates; the encouragement of peasant agriculture; and the training of young schoolboys without necessarily expecting it to bear a direct or immediate application in agricultural practice.

These and other aspects of the subject indicate the objectives of a comprehensive policy. They are not all attainable, nor is it desirable that they should be be attainable, at any one institution. There are, in fact, various organizations in the country, each of which is concerned with its own aspect or aspects of the subject and, in order that real advances may be made in local agricultural practice, it is essential that such organizations should be carefully planned and conducted and that there should be close collaboration between them.

While we cannot look back and review its progress over a long period of years, agricultural education in Malaya is nevertheless no mushroom growth, and the present occasion is perhaps an opportune one on which to consider the position, trace past progress and visualize the future.

Early efforts in our agricultural education followed two unrelated channels. In one, the Department of Agriculture found it necessary to instruct probationary Asiatic officers to fit them for junior appointments. Probationers were until 1924 attached to senior research or field officers for this training, but in that year a considerable advance was made by centralizing instruction under a single European teacher at headquarters, thus bringing into being a school which was to prove the forerunner and nucleus of the present institution at Serdang. Following the second channel, the Education Department realized that a measure of agricultural training in the form of school gardening was a useful means of developing the body, training the mind and imparting to it an agricultural bias appropriate to the education of an essentially agricultural community. A start was therefore made at the Matang

College in Perak and in selected localities by establishing school gardens. This was later amplified in collaboration with the Department of Agriculture and was in due course firmly established by the inclusion of this subject in the curriculum of the Sultan Idris Training College whence come all teachers in Malay vernacular schools, a policy which has led to a very considerable increase in the number of school gardens throughout the Peninsula.

The success of the new policy of training the junior staff of the Department of Agriculture soon attracted attention and led to a revival of the demand for an institution which should be open to the public as well as to potential departmental officers and which would provide a higher standard of agricultural training and knowledge throughout the country. In spite of the financial difficulties of the time, proposals for a School of Agriculture at Serdang were approved by Government and the School was duly opened in 1931.

More recent developments include the opening of two Farm Schools, one in Malacca and one in Penang, which offer a year's course of essentially practical training designed to meet local rather than pan-Malayan requirements. It is possibly too early to judge their success but they are organized on elastic lines which should ensure their adaptability to any changes which may be indicated by experience and they should in due course exert a profound influence on the agriculture of the localities in which they are situated.

This brief résumé of the development of agricultural education in Malaya will assist in an appreciation of the present position. The centre of such education must necessarily lie in the Department of Agriculture itself and particularly in those divisions which are responsible for agricultural research. The School of Agriculture then becomes one of the most important links in the chain which carries a knowledge of this research to the Asiatic planter, other links being the Farm Schools together with such other activities as Demonstration Stations, the Rural Lecture Caravan, the work of the Asiatic Rubber Instructors, departmental publications in English and the vernacular, and even school gardens—although the principal function of the last-named may possibly still continue to lie in imparting an agricultural bias to elementary vernacular education rather than in attempting the more intensive and applied training associated with a purely agricultural institution.

It is evident that on the maintenance of a high standard at the School of Agriculture will largely depend the progress that can ultimately be attained in the general improvement of Malayan agriculture. The standard at which the School aims is not purely academic but takes into consideration such important factors as the physique and personality of its students in that many of these factors are destined to direct not only their training but also their personal influence towards the advancement of agriculture. Care is therefore essential not only in formulating the syllabus of work but also in the selection of its students. The School's function is clearly set forth in the prospectus but may be repeated here: "The function of the School is to provide agricultural education suited to the diverse needs of private agriculturists in Malaya and neighbouring territories and, in a minor degree, of recruits for junior appointments in local government agricultural services."

Up to the present time, 247 students and pupils have completed their training at the School, of whom 153 are known to have obtained employment in one capacity or another, while nearly 20 more are assured posts in the immediate future. Most of them have been absorbed by the Department of Agriculture and the Rubber Research Institute in the building up of their cadre of Asiatic officers. Actual employment figures are probably higher in that nothing is known of some 20 old boys who have failed to keep in touch with the School. These figures are sure proof of the practical utility of the instruction that is given.

Existing policy in relation to agricultural education has been designed to reach all classes of the community in Malaya. Its influence will be more widely and definitely realized as times goes on, especially if (as is believed to be the case) the small band of trained men from the School prove their value in the various positions they have obtained. Employers can do much to assist this progress by recruiting from the School as far as possible, but more far-reaching results may possibly be expected from the fact that Asiatic estate-owners are sending their sons for training in preparation for assuming greater responsibility in the management of the family property. While one may confidently regard this system of agricultural education as being well organized and conducted, the success of Government's efforts will depend in no small measure on the close and sympathetic co-operation of those members of the public who are in a position to make use of the facilities which are now available.

Original Articles.

GARCINIA ATROVIRIDIS OR ASAM GELUGOR

BY

J. N. MILSUM,

State Agricultural Officer, Perak.

Introductory.

It is, perhaps, not generally known that the unripe fruit of *Garcinia atroviridis*, when sliced and dried, forms a sour relish which is extensively sold throughout Malaya for use in curries. In parts of Perak the tree commonly occurs in Malay settlements and, when in season, the sliced fruit is often seen undergoing sun-drying on bamboo slats by the roadside. The Malay name for the tree is 'asam gelugor' and the collection, slicing and drying of its fruit form a small local industry. Certain allied fruits are used for the same purpose in other countries. The tree grows well under local conditions where it is found associated with fruit trees such as the mangosteen, (*Garcinia Mangostana*); durian, (*Durio zibethinus*); and champedak, (*Artocarpus champeden*).

There are numerous Garcinias in Malaya, several of which are edible, but our knowledge regarding them is incomplete. It is proposed in this article to give a brief description of *Garcinia atroviridis* together with an account of the preparation of 'asam gelugor' as practised in north Perak.

Description.

The tree is a handsome one, 20 to 60 feet high or more, and is stated by Ridley (1) to occur wild in forests at 1,500 feet altitude throughout Malaya. Many semi-cultivated specimens seen have a characteristic pyramidal shape with pendulous branches (Plate 1). When mature it requires a planting distance of at least 30 feet. It appears to be slow-growing and probably does not bear fruit until eight years old or more.

The leaves are opposite, long and narrow (often 8 in. by 2 in.), red when young, turning deep green. The surface is leathery with numerous thin inarching nerves. The petioles are dull-red, about 1 in. long.

The flowers are unisexual *i.e.* male and female flowers are produced on separate trees, as with other species of the genus Garcinia. The male inflorescence is disposed in terminal or axillary clusters containing up to sixteen flowers. The male flowers are 1 in. or more across with four fleshy sepals and four petals arranged in pairs alternately at right angles, the latter being bright crimson. The stamens are united in whorls on a fleshy receptacle surrounding a rudimentary pistil. The female flowers are usually terminal and produced singly, but a pair of lateral flowers may surmount the former. Sepals and petals are similar to those of the male flowers but the petals are somewhat smaller. The ovary is green, cylindrical, with a ribbed

PLATE I.

Garcinia atroviridis. Young tree showing pyramidal shape.

PLATE II.

Fruit preparatory to slicing, with drying slats under cover behind.

surface, at the base of which is a ring of abortive stamens. A large deep-red cap-shaped stigma crowns the ovary.

Immediately upon the ovary becoming fertilized it enlarges rapidly, the stigma shrinks and hardens, and the perianth loses most of its red colour. Apparently almost all the female flowers set fruits which is rather remarkable in view of the fact that considerable distances often separate the female and male trees. In the case of the mangosteen parthenogeny is suspected owing to the absence of records of male flowers occurring in Malaya. There is, however, no experimental proof of this.

The fruit is large, three to four inches in diameter, with a flattened apex and fluted surface, as is indicated by the name 'gelugor' (Malay: fluting, striation) (Plate II). When fully ripe it is brilliant orange-yellow in colour. It has an acid juicy fruit-wall which surrounds the solitary ovules, twelve to sixteen in number, attached to the placenta.

The seeds are small, about half an inch long, flattened, with a pulpy aril, and destitute of albumen. From the small number of observations made it appears that six to eight seeds are usually contained in each fruit. Upon maturing, and after the fruit has fallen from the tree, the fluted sections separate from the placenta and fall apart.

Self-sown seedlings are sometimes found growing near the female trees and so far as is known there is no other method of propagation practised other than from seed. It would be a considerable advantage should it be found possible to propagate trees vegetatively since this would ensure female trees being planted. As it is at present, male trees are allowed to continue to grow, the Malay owners failing to appreciate the fact that such trees are at all times unfruitful.

In a good season, a mature tree will produce several hundred fruits. The main season is stated to be from February to June, but fruiting occurs throughout the year.

Both fruit and leaves are used medicinally, and the juice is mentioned as a fixative for dyes (2). The fruit is also used for preserves, but its most important use is in the preparation of a substitute for tamarind in curries.

Preparation of Asam Gelugor.

At Changkat Jering in the Larut District of Perak, a village industry has been in existence for many years. This is the centre of the local industry but sliced fruit may be seen drying by the roadside at many places between Taiping and Kuala Kangsar.

Malay land-owners lease their trees, mainly to Chinese, at varying prices according to the size and reputation of the individual tree and crop expected. There are usually one or two trees in each holding, often thirty to forty years old. Young trees are only occasionally met with and there is no attempt at organized planting as with the rambutan. Prices range from 50 cents to $5 (Straits currency) per tree per annum. The sum agreed upon is paid in advance to the growers and in some cases a written agreement with the respective owners is retained by the lessee. The

lessee pays for fruit collection and arranges transport to centres for preparation; Malays usually do this work. They set out early in the morning and collect about a picul (133 lbs.) of fresh fruit by noon which is a sufficiently heavy load to transport by bicycle. The fruit arrives during the afternoon and is immediately sliced. The majority of the fruit is gathered green and under-ripe and is either hand-picked from the tree or secured by means of long bamboos. Immature fruit is more acid in flavour than ripe fruit.

The fruits are sliced singly by hand, by an operator sitting astride a long board provided with a sharp cutting knife slotted in at one end (Plate III). The knife is about 8 in. long and 4 in. wide, fitted with two prongs which are fastened down to the board with wooden wedges. By this means slices of equal thickness are obtained. A narrow slot in front of the cutting edge allows the slices to fall into a basket below the board. The slice is usually $\frac{1}{8}$ in. thick, but this depends upon ruling prices and weather conditions, the thinnest slices being prepared during the wet weather. The cutting instrument is imported from China where it is commonly used for slicing sweet potato tubers, and is known in Malaya as 'tagat asam.'

Immediately after cutting, the slices are placed in a single layer on bamboo slats, about 8 feet long and 3 feet wide, which is a convenient size for lifting. The slats are placed in an open space, often the roadside, exposed to the sun (Plate IV). During the night and in rainy weather the slats are stored under shelter. Drying takes from two to five days according to weather conditions. The size and weight of fruit varies considerably. About 200 good sized fruits weigh 1 picul (=133 lbs.). The percentage of prepared product to fresh fruit naturally depends upon the extent to which the slices are dried, but approximates to 17 per cent.

The writer is indebted to the Senior Chemist, S.S. and F.M.S., for moisture determinations. The moisture content of fresh slices of fruit was 86 per cent. and that of a sample of the prepared product 19 per cent. The loss on drying, calculated on the weight of the fresh slices of fruit, amounts to approximately 82.3 per cent.

The Chinese who prepare 'asam gelugor' sell their produce wholesale to distributors in the towns. Wholesale prices fluctuate considerably according to the amount of fruit available. At the time of writing (March, 1938) it is from $14 to $15 per picul; this price, however, falls as fruit becomes more plentiful. The retail price at present is about 20 cents per kati (=1.3 lb.).

Local 'asam gelugor' is despatched to Kedah, Penang, Kelantan and Trengganu. The commodity apparently does not deteriorate readily and is often stored for several months before sale. This seems remarkable in view of the high moisture content of the prepared product.

Use.

The 'asam gelugor' is washed in cold water before use. A few pieces are then placed in the receptacle containing the curry ingredients. The addition of 'asam gelugor' gives a characteristic relish to the curry, which is much liked by Malays and Chinese, especially by the former. Usually a handful or so, costing one or two cents, is purchased as often as required. It is estimated that a Malay family may

PLATE III.

Fruit being sliced and placed on slats for sun-drying.

PLATE IV.

Slices drying on slats by the roadside.

Garcinia atroviridis.—1, Female flower. 2, Female flower in section. 3, Male flower. 4, Male flower in section. 5, Fruit. 6, Fruit, showing fluted sections with seeds surrounding the placents. 7, Seed with aril removed. (all reduced).

use ½ to 1 kati per month. Indians do not require it as they use almost solely the preserved acid pulp of the tamarind tree (*Tamarindus indica*), known locally as 'asam jawa,' large quantities of which are imported into this country from India. 'Asam jawa' is also used to some extent by Malays. A further use for 'asam gelugor' is for dressing fish.

Conclusions.

The industry in the Larut District of Perak appears to be tolerably well organized and several Chinese who prepare the product have been in the business for many years. It is difficult to estimate the extent of the trade in Malaya since it is almost entirely an internal one. A keen demand for fresh fruit, however, exists, and there is no over-production.

The great majority of the trees seen are old, and little replanting appears to have been undertaken since the Para rubber tree made its appearance in the 'kampong' some thirty years ago. Extended planting in new areas appears to be worth encouraging since it is a village industry well-suited to the Malay land-owner. Investigations regarding possible variations in quality of fruit and improved methods of propagation and cultivation should give useful results. Further, since *Garcinia atroviridis* is unisexual much waste of space would be eliminated by planting female trees should vegetative propagation be proved possible.

Acknowledgment.

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MALAYAN AGRICULTURAL TRADE IN 1937

BY

D. H. GRIST,

Agricultural Economist.

Prices.

There was a welcome improvement in market prices of practically all the agricultural products of Malaya in 1937. Prices were sharply on the up-grade during the latter part of 1936, and continued to improve during the first half of 1937. During the last six months of 1937, however, there was a retrograde movement and the year ended with prospects far less encouraging than they were earlier in the year.

It will be remembered that prices were satisfactory in 1928, but from the following year they fell steadily, reaching their lowest values in 1933 and 1934. In the past three years they have shewn a steady improvement, and it may be said that prices in 1937 were comparable with those ruling in 1930. This applies to all the main export crops with the exception of pepper, the market for which was affected by market manipulations a few years back, and pineapples, the prices of which have been depressed by considerably increased production which appears to call for improved marketing methods.

Table I shews the average Singapore prices for the past few years.

As in previous reviews of Malayan agricultural trade, the subject will be treated in this place under three heads—the production of crops for internal consumption, agricultural products for export, and the preparation for market of products from neighbouring countries. The crops included in this review are those grown in Malaya and also crops which at least theoretically, although perhaps not economically, might be grown in this country.

Local Agricultural Products.

Chief amongst the crops grown for local consumption is rice; in addition there are coconut products, vegetables, fruits, coffee, tea, tobacco, and a number of minor crops. Statistical information of the production and local consumption of rice and tea is reasonably accurate, but for the other crops in this category in addition to such crops as arecanuts, cultivated for local consumption and foreign export, this information is not available.

The production of rice in Malaya in the 1936-37 season amounted to 319,234 tons from an area of 740,040 acres. These figures are well up to average and indicate that the policy of the local Governments in fostering padi production by such means as improved irrigation and selected seed is successful in maintaining production of this staple food product.

Local production supplies only 36 per cent. of Malaya's rice requirements, net imports amounting to 573,063 tons. Total consumption of rice was 892,297 tons, which, on the basis of present yields of padi in Malaya, would require an

Table I.

Average Annual Market Prices in Singapore of Agricultural Products.

Year	Rubber per lb.	Copra per picul	Coconut Oil per picul	Palm Oil per ton	Palm Kernels per ton	Gambier per picul	Sago per picul	Tapioca per picul	Nutmegs per picul	Pepper per picul	Arecanuts per picul	Pineapples per case
	cents	$	$	£ s. d.	£ s. d.	$	$	$	$	$	$	$
1929	34.63	9.45	16.69	28 6 3	18 4 3	14.69	7.98	6.27	46.60	57.31	9.10	
1930	19.15	7.81	14.35	23 7 2	13 5 5	15.30	6.56	4.73	31.03	33.56	8.95	
1931	9.82	5.09	9.69	18 18 3	10 7 7	17.39	5.01	3.59	23.02	20.39	6.75	
1932	6.97	5.74	10.04	17 18 9	11 1 3	14.83	4.25	3.23	24.78	20.44	5.62	3.34
1933	10.21	3.90	7.70	16 0 3	8 16 4	7.70	4.17	4.35	20.50	14.49	6.50	3.11
1934	20.63	2.94	5.96	12 9 3	6 12 8	7.76	3.92	4.13	23.41	16.33	6.50	3.10
1935	20.35	4.54	9.13	19 19 8	8 13 9	10.53	3.86	4.38	29.40	12.37	6.74	3.47
1936	27.04	5.81	11.96	19 18 2	11 0 11	10.30	4.10	5.50	29.62	8.36	6.83	3.29
1937	32.09	6.45	11.13	22 3 4	12 14 5	15.71	5.24	5.15	34.77	9.91	7.71	3.02

additional area of 1,332,000 acres, if Malaya is to become independent of foreign imports.

The value of Malayan production of rice in 1937, based on the average wholesale price of Rangoon rice in Singapore, was $20,100,000 or $350,000 greater than in 1936.

From a rough estimate of local consumption of Malayan production of such crops as coconuts, vegetables and fruits, it is probable that Malaya now produces fully 50 per cent. of her food requirements.

Export Crops.

The principal export crops are rubber, coconut products, pineapples, oil palm products and arecanuts. Amongst other export crops are tapioca, sago, gambier, derris root, and spices.

Rubber.—Exports were subject to control under the International Rubber Regulation Scheme. Net exports were 468,189 tons valued at $341,183,175, as compared with 352,343 tons, valued at $208,481,052 in 1936. The improvement of the rubber market has contributed materially to the well-being of the community, and this is particularly felt by the Asiatic small-holder whose means at the best of times are slender so that the margin between prosperity and poverty is narrow.

Coconut Products.—The net exports of coconut products shewed a decline over the past two years, possibly due to the less favourable season coupled with increased local consumption resulting from the general improvement of prices of other export products. Net copra exports at 75,592 tons were 1,000 tons less than in 1936; the value of these exports, however, improved by 1 million dollars to $9,207,000. Coconut oil net exports decreased by nearly 7,000 tons, although the total value of 1937 exports was approximately the same as in the previous year. In addition to the foregoing, fresh coconuts and coconut cake are exported in considerable quantities. In 1937, the copra equivalent of total net coconut products exported amounted to 142,110 tons or about 12,400 tons less than 1936. The value of these exports was $17,761,000 or nearly 1 million dollars in excess of 1936 values, and the highest figure reached since 1930.

Pineapples.—Owing to increased acreage under this crop, much of which is now planted as a sole crop instead of as a catch crop with rubber as was formerly the case, the production of canned pineapples increased and exports rose by 4,000 tons to a total of 80,504 tons in 1937, in addition to which it is stated that a considerable stock of canned pineapples is held in the country. The value of exports amounted to $8,825,551. Exports constituted a record and it is expected that this figure will be exceeded in 1938.

It will be seen that canned pineapples were one of the very few agricultural products which did not share in the general upward trend of prices. This is probably due to increased competition in the United Kingdom with other canned fruits and to defects in marketing methods.

Oil Palm Products.—The Malayan oil palm industry continued to expand, due to an increased area coming into production and the numerous areas where the

palms were reaching the age of full productivity. Net exports of oil amounted to 42,787 tons valued at $6,492,862, and of kernels 7,312 tons valued at $626,967. Production of oil increased by 13,773 tons and kernels by 2,774 tons over 1936, while the total value of net exports in 1937 at $7,119,829 was $2,825,720 in excess of 1936.

Arecanuts.—Net exports at 30,084 tons shewed an increase over 1936 of 3,536 tons, while the value of exports in the year under review at $4,333,519 shewed an improvement of $1,096,148 over 1936.

The remainder of the export crops call for little comment: tapioca net exports increased slightly, while sago increased from 2,012 tons in 1936 to 10,981 tons in 1937. Gambier exports declined still further, though values improved slightly. The derris market shewed no expansion and values no improvement.

Table II.

Imports and Exports of certain Agricultural Products 1937.

Product.	Imports		Exports.		Net Exports	
	Tons	Value $	Tons	Value $	Tons	Value $
Rubber ...	213,449	143,478,636	681,638	484,661,811	468,189	341,183,175
Coconut Products ...	126,143	13,751,261	263,325	31,512,586	137,182	17,761,325
Pineapples ...	2	905	80,504	8,825,551	80,502	8,824,646
Oil Palm Products ...	140	26,204	50,239	7,146,033	50,099	7,119,829
Arecanuts ...	53,071	6,243,993	83,155	10,577,512	30,084	4,333,519
Tapioca ...	6,761	532,507	24,212	1,983,751	17,451	1,451,244
Sago ...	63,379	3,345,813	74,360	4,917,308	10,981	1,571,495
Gambier ...	2,161	350,235	4,116	892,551	1,955	542,316
Derris Root ...	52	17,942	625	401,914	573	383,972
Pepper ...	9,887	2,420,966	10,712	2,892,636	825	471,670

Table II shews the trade in the chief products and also exhibits the value of the entrepôt trade, especially in rubber, coconut products, arecanuts, sago and pepper. Much of this trade is concerned in the conditioning of the products to render them suitable for the world's markets.

The gross agricultural trade of Malaya in 1937 amounted to 3,249,000 tons valued at $875,000,000 as compared with 2,998,000 tons, valued at $609,000,000 in 1936 and 2,958,000 tons, valued at $533,000,000 in 1935.

Table III.

Annual Net Imports and Exports of Agricultural Products, Malaya.

Year.	Net Imports*		Net Exports† (excluding rubber)		Excess of Imports over Exports (excluding rubber)		Net Exports of Rubber		Excess of Total Imports over Exports	Excess Value of Exports over Value of Imports
	Quantity. Tons	Value $	Quantity. Tons	Value $	Quantity. Tons	Value $	Quantity. Tons	Value $	Quantity. Tons	Value $
1923	643,000	101,600,000	200,600	43,100,000	430,400	58,500,000	181,700	227,200,000	254,700	168,700,000
1924	694,600	118,400,000	219,000	51,600,000	475,600	66,800,000	152,500	189,900,000	323,100	123,100,000
1925	744,800	133,100,000	218,700	48,600,000	526,100	84,500,000	161,800	519,000,000	364,300	434,500,000
1926	857,300	157,300,000	225,800	50,000,000	631,500	107,400,000	243,400	547,500,000	388,100	440,100,000
1927	956,000	167,400,000	207,500	42,700,000	748,500	124,700,000	190,700	351,400,000	557,800	226,700,000
1928	921,400	158,900,600	230,700	44,900,000	690,700	114,000,000	260,100	262,900,000	430,600	148,900,000
1929	1,004,500	171,700,000	254,700	44,000,000	749,800	127,700,000	418,000	353,700,000	331,800	226,000,000
1930	1,022,300	150,800,000	244,100	37,800,000	778,200	113,000,000	421,000	199,600,000	357,200	86,600,000
1931	883,200	92,100,000	241,200	26,700,000	642,000	65,400,000	393,600	99,300,000	248,400	33,900,000
1932	737,800	74,200,000	253,500	29,000,000	484,300	45,200,000	386,000	68,100,000	98,300	22,900,000
1933	770,000	66,700,000	265,700	25,600,000	504,300	41,100,000	445,700	101,400,000	58,600	60,300,000
1934	871,200	78,700,000	272,800	23,400,000	598,400	55,300,000	465,800	207,900,000	132,600	152,600,000
1935	885,100	81,100,000	314,500	40,000,000	750,600	41,100,000	415,700	191,100,000	154,900	150,000,000
1936	991,900	87,100,000	311,400	36,700,000	680,500	50,400,000	352,300	208,500,000	328,200	158,100,000
1937	1,081,200	103,200,000	328,500	42,500,000	752,700	60,700,000	468,200	341,200,000	284,500	280,500,000

* Imports include coir cordage and fibre, mats and matting, padi and rice, coffee, tea, kapok, mace and nutmegs, pepper, ginger, groundnuts and groundnut oil, sugar, tobacco, vegetables, livestock for food, meat, leather goods, milk, butter, poultry and eggs, feeding stuffs for animals, ataps, cloves, castor oil, gingelly seed and oil, fruits, citronella oil and flowers.

† Exports include rubber seed, coconut products, palm oil and kernels, canned pineapples, arecanuts, sago, tapioca, derris root, hides and skins, gambier, patchouli leaves and oil, mace and nutmegs, pepper and gambier.

To summarize, net exports of agricultural products other than rubber shewed an increase of 5 per cent. over 1936, being 328,503 tons, the highest figure on record. Net export values were $42,470,051, an increase of 15.6 per cent. over 1936 and the highest figure since 1929.

Adding net exports of rubber, the figures become:—

1935	730,127	tons	valued	at	...	$231,176,882
1936	663,701	,,	,,	,,	...	$245,218,982
1937	796,692	,,	,,	,,	...	$383,653,226

The Value of Agricultural Trade.

The actual value to Malaya of her agricultural trade may be estimated by consideration of the balance of net exports over net imports. Table III reviews the position annually since the year 1923. From this data a balance is struck of the volume and value to Malaya of the year's trading.

In 1937, the net imports (excluding rubber) were 1,081,200 tons, valued at $103,200,000. Net exports (excluding rubber) were 328,500 tons, valued at $42,500,000. Malayan agricultural trade of crops other than rubber (the chief export crop) and rice (the chief import crop) shewed an excess of imports of 180,000 tons, valued at $22,480,000. Malaya thus draws on other countries to a large extent for many agricultural products to satisfy internal consumption. Chief amongst these may be mentioned the following net import figures:— rice 573,063 tons, valued at $38,211,000, tobacco 6,719 tons, valued at $15,994,000, milk to the value of $9,004,000, sugar 117,988 tons valued at $7,791,000, vegetables $4,877,000, fruits $4,268,000, groundnuts and groundnut oil $4,090,000, livestock and meat $5,657,000. All these import values shew a considerable increase over the corresponding figures for 1936, nearly 9 per cent. in quantity but nearly 16 per cent. in value.

With a measure of return to prosperity of the major industries of Malaya (tin and rubber) the country has increased her imports of agricultural products for local consumption and has been able to meet the increased cost of such goods as she requires. On the other hand, these increased demands for imported agricultural products have been more than adequately met by the improvement in her agricultural export trade. This is demonstrated by the fact that while the excess of total agricultural imports over exports was 284,500 tons, the excess value of Malayan agricultural exports over values of imports was $280,500,000, a figure which has not been exceeded since the year 1926. With the exception of the rubber and palm oil industries it cannot be said that there has been any marked increase in the importance of local agriculture, as indicated by exports, but the fact that several of the smaller industries shew a distinct revival is an encouraging feature, while the improvement of market prices, if maintained in 1938, should have the effect of encouraging greater production especially by small-holders who in particular benefit by improved market conditions of the, commercially, less important crops.

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THE MALAYAN RUBBER PLANTING INDUSTRY IN 1937.

Compiled from official and other records by the Economics Branch of the Department of Agriculture, S.S. and F.M.S.

Prices.—The monthly average Singapore spot price of No. 1 rubber smoked sheet was 36.47 cents per lb. in January and 35.89 cents in February, but improved to 39.80 cents in March and 40.25 cents in April. Thereafter, apart from minor fluctuations, the price fell steadily throughout the remainder of the year. The highest Singapore price of the year was 45⅜ cents at the end of March and the lowest was 22⅛ cents per lb. at the end of December. The average prices per lb. for the year in the chief markets are compared with those for 1936 in Table I.

Table I.

Prices per lb.

Market	1936	1937
Singapore (cents, Straits) ...	27.04	32.09
London (pence) ...	7.72	9.42
New York (cents, gold) ...	19.27	16.30

Areas.—The total area under rubber in Malaya at the end of 1937 was estimated to be 3,304,657 acres, as shewn in Table II.

The total area of reserve land on estates in Malaya at the end of 1937 was 620,076 acres, of which 23,514 acres were building sites, and 68,319 acres planted with other crops. The total mature area, *i.e.* planted during the season 1929-30 or earlier, was 1,847,218 acres, and the tappable area, as declared by estates, was 1,883,250 acres.

Ownership and Constitution of Estates.—Of the total area of estate rubber in Malaya 75.4 per cent. is European owned, 15.9 per cent. owned by Chinese, 4.3 per cent. by Indians, and 4.4 per cent. by other nationalities.

Of the 2,500 estates in Malaya, 878 (1,542,256 acres) are owned by public limited liability companies, while the remainder, 1,622 (484,092 acres), are in the hands of private limited liability companies or privately owned.

There were 1,557 estates (318,819 acres) between 100 and 500 acres in size, 358 estates (260,245 acres) between 500 and 1,000 acres, 532 estates (1,051,751 acres) between 1,000 and 5,000 acres, and 53 estates (395,533 acres) over 5,000 acres.

Production, Exports and Stocks.—The production of rubber in Malaya during 1937 amounted to 503,127 tons, as compared with 365,005 tons in 1936. The distribution of production in 1937 is shewn in Table III.

Table II.

Area Under Rubber in Malaya as at end of 1937.

(in acres)

Territory	Estates *			Small Holdings†	Planted Area
	Mature Area	Immature Area	Total Planted Area	Total Planted Area	
Perak ...	288,043	19,302	307,345	265,988	573,333
Selangor ...	330,393	21,448	351,841	142,910	494,751
Negri Sembilan ...	254,296	28,806	283,102	99,213	382,315
Pahang ...	83,270	7,868	91,138	83,995	175,133
TOTAL F.M.S....	956,002	77,424	1,033,426	592,106	1,625,532
Malacca ...	122,282	4,333	126,615	67,680	194,295
P. Wellesley ...	43,537	1,575	45,112	23,384	68,496
Penang ...	2,491	392	2,883	15,280	18,163
Singapore ...	32,969	211	33,180	19,568	52,748
Labuan ...	—	—	—	1,825	1,825
TOTAL S.S. ...	201,279	6,511	207,790	127,737	335,527
Johore ...	438,831	84,314	523,145	360,759	883,904
Kedah ...	199,716	8,936	208,652	96,274	304,926
Perlis ...	1,340	334	1,674	3,334	5,008
Kelantan ...	31,527	1,015	32,542	58,271	90,813
Trengganu ...	12,863	290	13,153	31,653	44,806
Brunei ...	5,660	306	5,966	8,175	14,141
TOTAL U.M.S. ...	689,937	95,195	785,132	558,466	1,343,598
TOTAL MALAYA ...	1,847,218	179,130	2,026,348	1,278,309	3,304,657

* Estates = 100 acres and over.
† Small Holdings = under 100 acres.
Acreage of mature rubber represents acreage planted in season 1929—1930 or earlier.

The area of tappable rubber on estates in Malaya at the end of 1937 was 1,883,250 acres, of which 24.8 per cent. (467,039 acres) was out-of-tapping, including areas rested under rotational systems of tapping. In the Federated Malay States 40.6 per cent. of the tappable area was out of tapping in January 1937, but this percentage fell steadily throughout the year to 31.6 per cent. in December with the increase in the export quota. Similarly in the Straits Settlements the percentage fell from 33.6 to 24 per cent. and estates in the Unfederated Malay States likewise increased their areas in tapping.

Table III.*

Malayan Production of Rubber in 1937

Area	Production by estates of 100 acres and over	Production by estates of less than 100 acres	Total Production
	Tons	Tons	Tons
Federated Malay States ...	166,255	91,134	257,389
Straits Settlements ...	26,560	16,730	43,290
Unfederated Malay States ...	121,843	80,605	202,448
TOTAL 1937 ...	314,658	188,469	503,127
TOTAL 1936 ...	233,118	131,887	365,005

* Abstracted from the December statement of acreage, stocks, production, imports and exports of rubber, etc., published by the Registrar-General of Statistics, Straits Settlements and Federated Malay States.

The exports of rubber in concentrated forms of latex increased over the previous year by 2,471 tons, as shewn in Table IV. The quantity of rubber estimated to be contained in this exported latex is included in the figures of production given above and also in the figures of total exports given in Table VI.

Table IV.

Exports of Rubber in Concentrated Forms of Latex.

Year	Dry rubber content of latex in lbs. per gallon			Total	Value
	Under 4.8 lbs.	4.8 to 5.7 lbs.	Over 5.7 lbs.		
	Tons	Tons	Tons	Tons	$
1931 ...	—	—	—	1,925	472,123
1932 ...	—	—	—	5,192	1,110,103
1933 ...	—	—	—	10,470	2,871,407
1934 ...	—	—	—	14,172	7,119,548
1935 ...	5,286	5,490	2,374	13,150	6,585,369
1936 ...	6,778	7,073	3,086	16,937	10,673,229
1937 ...	7,122	7,512	4,774	19,408	15,429,910

Table V.

Rubber Stocks in Malaya at end of 1937.

Stocks	Tons
At ports	12,210
In hands of dealers	53,850
On estates of over 100 acres	24,488
Total ...	90,548

Stocks held by small-holders are considered to be negligible.

Local consumption of rubber by manufacturers of rubber goods, tyres, tubes, belting, shoes, etc., amounted to 576 tons, as compared with 435 tons in 1936, 593 tons in 1935 and 872 tons in 1934.

Table VI.

Shipments of Crude Rubber from Producing Countries.*

(tons)

Year	Malaya includ : Brunei & Labuan	Nether-lands Indies	Ceylon	Sarawak	Siam	French Indo-China	All other Sources	Total
1931	423,000	257,000	62,300	10,400	3,600	11,000	32,400	799,700
1932	406,000	211,000	49,300	7,100	3,000	13,500	18,800	708,700
1933	445,800	282,300	63,800	11,100	7,000	17,300	26,200	853,500
1934	467,400	379,400	79,100	17,600	17,700	19,600	38,300	1,019,100
1935	417,000	282,900	54,300	19,300	28,300	28,700	42,100	872,600
1936	353,667	309,630	49,685	21,013	34,578	40,769	46,285	855,627
1937	469,960	431,646	70,359	25,922	35,551	43,399	58,270	1,135,107

* Abstracted from the Statistical Bulletin of the International Rubber Regulation Committee, Vol. 4, No. 2, February 1938.

Operation of the Rubber Regulation Scheme.—Rubber production during the year was regulated in accordance with the International Agreement 1934-38, and the system continued to work smoothly. Malaya's quota was 589,000 tons and the releases were:—for the first quarter 75 per cent.; second quarter 80 per cent.; third and fourth quarters 90 per cent.

Under the agreement, replanting was permitted to the extent of 10 per cent. of each owner's holding in any one year and to a total of 20 per cent. of the holding during the period 1st June, 1934 to 31st December, 1938. The area replanted on estates during 1937 was 29,039 acres, much less than the total amount permissible under the agreement.

Budgrafting.—The total budgrafted area in 1937 and comparisons with previous years are shewn in Table VII.

Table VII.

Areas of Budgrafted Rubber in Malaya.

	1935		1936		1937	
	No. of areas	Total acreage	No. of areas	Total acreage	No. of areas	Total acreage
Federated Malay States ...	391	106,813	402	111,369	445	120,927
Straits Settlements ...	53	3,885	51	3,833	54	4,634
Unfederated Malay States ...	157	89,311	175	93,734	178	94,364
Total ...	601	200,009	628	208,936	677	219,925

The above table takes into account the proportion of budgrafts in areas under mixed budgrafts and seedlings. The actual area in Malaya of budgrafts only (approved clones) was 175,350 acres. There were 76,508 acres of mixed budgrafts and seedlings, and 13,377 acres planted with clonal seed.

At the end of 1937, of the total area of budded rubber (219,925 acres), 136,235 acres had reached the tappable stage, while the actual area of such rubber being tapped was 94,907 acres.

Conditions on Estates.—Estates generally are now maintained in good condition. Improvements begun during the last year or two were continued during 1937, but the rising cost of labour and the falling price of rubber suggest that expenses will have to be reduced in the near future. The area out of tapping was estimated to be 467,000 acres at the end of the year.

Methods of clearing ranged from simple tree-felling, with no stump or root removal, to clean-clearing, followed by deep digging and complete root extraction. From the point of view of root disease control, selective clean clearing of disease patches, with a minimum of root removal in the healthy areas, would appear to

be the most economical policy.

Manuring continued to engage the attention of estates during 1937. Convincing results are now being obtained from the experiments started a few years ago by the Rubber Research Institute of Malaya and by other concerns; it is, therefore, likely that manuring will become a standard practice on plantations, so long as the price of rubber does not fall much below its present level.

The scheme for experimental planting of new land was almost completed in 1937. Rubber Regulation permits new planting for experimental purposes up to a total of one-quarter of 1 per cent. of the total area under rubber in the country during the period of the agreement. The total allowance for Malaya is thus approximately 8,000 acres. The area approved for planting under this clause during 1937 was 3,346 acres, which left only 552 acres remaining out of the 8,000 acres. The allocations were made on a State basis, *i.e.* in proportion to the area of rubber in each territory. The experiments are carried out under the control of the Rubber Research Institute of Malaya, with whom and the Controller of Rubber the estate enters into an agreement as regards maintenance and continuity. The experiments are designed to investigate all important aspects of rubber planting.

Continued interest has been shewn by estates in cover plants, both planted and "natural" types. The value of covers in old rubber is well appreciated as is also the necessity for supplementing them with manures.

Conditions on Small Holdings.—Quarterly surveys clearly shewed the reduction in small holdings out of tapping which occurred during 1937. The increase in tapping was due primarily to the increased quota and to the fact that uncouponed rubber commanded very high prices, as dealers who had bought coupons without rubber had to cover such coupons with physical rubber by the end of each quarter.

There was a slight decrease in tapping in the fourth quarter due principally to wet weather which rendered tapping impossible and also to the Hari Raya (Mohammedan) festivities.

Table VIII summarizes the results of the quarterly surveys during 1937, and includes the December, 1936, survey for the purpose of comparison.

Table VIII.

Percentages of Areas of Small Holdings out of Tapping during 1937.

	Dec. 1936 Percentage	Mar. 1937 Percentage	June 1937 Percentage	Sept. 1937 Percentage	Dec. 1937 Percentage
F.M.S. ...	37.5	29.5	19.4	16.0	19.1
S.S. ...	18.0	22.7	10.7	7.9	10.1
U.M.S.	26.6	23.3	15.5	7.9	13.9
Malaya	30.8	25.7	16.8	11.7	16.0

The trade in coupons without rubber and in uncouponed rubber has again been a noticeable feature of the small-holding rubber market. In the first quarter of 1937 the value of coupons was from $32 to $35 per picul equivalent, uncouponed rubber being sold at prices ranging from $12 to $21 per picul.

In the second quarter the position was reversed, and, coupled with the weakening of the rubber market generally, coupons fell—in one district—from $35 in March to $10 in June, while uncouponed rubber improved in value by $8 per picul.

In the third quarter uncouponed rubber was still commanding a high price, but by the end of the quarter coupons were again improving, doubtless owing to dealers requiring to cover stocks with export rights. Coupons similarly improved in value in December, when required for balancing stocks, whereas in October and November their value was extremely low and in some districts they were practically unsaleable.

The generally improved conditions of small holdings are being maintained, particularly with regard to disease control and care of utensils. Small-holders, both Malay and Chinese, have responded well to the advice of the Asiatic Rubber Instructors.

Owner tappers are taking advice on better systems of tapping, but difficulties are encountered when owners will not adequately supervise paid labour, particularly where work is given to poorer relations.

Considerably more attention is now being paid to tapping methods and quality of tapping on small holdings, and this improvement is particularly noticeable on the medium-sized holdings of Chinese ownership. The tapping on such holdings is often equal to the standard of estate practice, and it is possible that in many cases the owners have gained their knowledge while employed on large estates in addition to benefiting from the practical demonstrations of the Asiatic Rubber Instructors.

Increasing attention has been given to budgrafting, and several small holdings in various parts of the country have undertaken budding with the co-operation and supervision of the Asiatic Rubber Instructors.

In Pahang a marketing scheme has been in operation for some time whereby dealers display samples of the various grades of rubber and pay higher prices for the better grades. This scheme worked smoothly throughout the year and provides a valuable guide to quality of production.

A large number of the cheap smoke-house approved by the Rubber Research Institute of Malaya were erected during the year, and partially as a result of their use the general standard of small-holding rubber has improved considerably. There is, however, a tendency to abandon the manufacture of smoked sheet and return to old methods, due principally to the small premium granted by dealers for smoked sheet which is often insufficient to repay the extra labour involved.

In Pahang the total number of cabinets erected by the end of the year was 166, practically all of which were in use. The value of this cheap form of smoke cabinet was strikingly demonstrated in Brunei where 194 were erected during the year, making a total of 212, the majority of which were in regular use. In Brunei,

owing to the loss involved in freight and export duty on wet rubber, the difference in price between smoked and unsmoked sheet was as high as $10 per picul for a considerable period in 1937, with the result that the amount of smoked sheet produced increased considerably.

Increased attention has been devoted in Kelantan to the manufacture of sheet rubber, as is demonstrated by the very large increase in the number of hand mangles imported during the year. During 1937, 2,058 machines were imported, as compared with 567 in 1936, and 483 in 1935. The Department of Agriculture supplied 249 machines to small-holders, as compared with 38 in 1936.

In Kelantan also, special attention was given to the use of suitable strainers, and 160 sieves of an approved type made locally were sold.

Pests and Diseases.—The general improvement of foliage noticed in 1936 was maintained in 1937, for the weather in most parts of the country about the time of wintering was unfavourable to an epidemic of the leaf-mildew *Oidium Heveae*. Thrips, mites and spiders gave some trouble in young rubber areas, and the practice of controlling them by sulphur-dusting found great favour. Much trouble was also caused in young areas by the giant snail. Fortunately, poison baits containing "Meta" (a patent fuel) proved very effective in checking this pest. The control of root diseases received increasing attention during the year, particularly in connexion with replanting. Experiments have been started by the Rubber Research Institute of Malaya to find the cheapest way of dealing with root diseases during planting, consonant with efficiency. Termites continued to do damage, and it is noteworthy that small-holders shewed an increasing tendency to treat this pest on approved lines. The cockchafer pest also occasioned much harm in a few areas, but fortunately did not spread as much as was feared; methods of treatment by soil fumigants at an economic cost have been devised.

Labour.—The total labour force employed on estates at the end of 1937 was 351,404, composed of 233,700 men, 92,857 women, and 24,847 children, or 17.3 labourers employed per 100 planted acres of rubber. At the end of 1936 the total estate labour force was 278,515 persons, or 13.7 per 100 acres.

Acknowledgments.

Acknowledgment is made to the Rubber Research Institute of Malaya for the information contained in this article relating to conditions on estates, and to pests and diseases. Acknowledgment is also made of information on the operation of the Rubber Regulation Agreement supplied by the Controller of Rubber, Malaya.

CONDITIONS ON RUBBER SMALL HOLDINGS IN MALAYA.

1st Quarter 1938.

Prepared by the Economics Branch of the Department of Agriculture, S.S. and F.M.S., in collaboration with the Field Branch of the Department.

Rainfall.

Weather conditions were normal for the first quarter of the year. January and February were dry, with drought conditions in some districts, and March was very wet. Abnormal rainfall was experienced in February in Kedah.

Prices and Production.

Prices paid for small-holders' rubber are summarized in Tables I and II, which shew the extremes and means of prices recorded at a number of centres in each State.

The price of ordinary rubber followed the trend of the Singapore market, but the value of uncouponed rubber fell heavily and in Selangor was as low as $5 per picul in March, while in Malacca it was reported as almost unsaleable. The value of coupons improved sharply at the commencement of the quarter, rising to $20 per picul equivalent in Perak South, but in March a fall of $2 was recorded. In Kedah, coupons were realizing $12 per picul equivalent, while uncouponed rubber was sold at $7 to $7.50 per picul.

Production of small-holding rubber for the quarter is shewn in Table III which is prepared from the monthly reports of production, stocks, imports and exports of rubber, published by the Registrar-General of Statistics, S.S. and F.M.S.

Tapping and Condition of Holdings.

There was a considerable increase in the number of small holdings out of tapping in the quarter under review. Tables IV and V tabulate the results of the quarterly survey and provide a comparison with previous quarters.

The reduced coupon allowance coupled with the low price for uncouponed rubber is probably the primary cause of the reduction of tapping, but the first quarter of the year includes the "wintering" period and is also the time of the padi harvest in certain districts. In Selangor, in the inland districts, reduction in tapping took place owing to work commencing on the preparation of padi land for the new season's crop. The heavy rains of March were a further cause of reduced tapping.

The considerable percentage of untapped holdings in the Dindings is attributed to the fact that owners probably make a larger income by fishing or following some other form of occupation.

Reports indicate that the general improved condition of holdings is being maintained except in certain cases where padi harvesting has interfered with work on rubber holdings.

Table I.

Lowest and Highest Rubber Prices Paid by Local Rubber Dealers.

(In Straits dollars per picul (133 1/3 lbs.))

1st Quarter 1938.

	Penang	Perak	Selangor	Negri Sembilan	Pahang	Malacca	Kedah	Johore
				JANUARY				
Smoked sheet	26.00-31.50	24.00-29.00	26.00-29.50	25.00-29.00	22.50-29.50	28.50-31.00	27.00-29.00	24.50-30.00
Unsmoked sheet	25.00-30.50	22.00-27.50	23.00-27.50	23.00-27.00	21.50-27.50	25.00-28.50	23.50-28.00	23.00-29.00
Scrap	16.00-20.00	15.00-21.00	19.00-21.00	—	18.00-20.00	17.50-22.50	18.00-22.00	16.50-21.00
				FEBRUARY				
Smoked sheet	26.00-31.00	25.00-31.10	25.00-29.60	26.00-34.00	24.50-30.00	29.50-31.00	27.50-30.00	23.60-29.60
Unsmoked sheet	25.00-30.00	23.00-28.30	22.00-27.50	23.00-29.00	24.00-28.50	26.00-30.00	24.00-28.50	22.00-29.00
Scrap	15.50-20.00	17.00-22.00	20.00-21.50	—	18.00-21.00	20.50-23.00	17.00-23.00	16.00-22.50
				MARCH				
Smoked sheet	23.00-28.50	23.00-29.50	23.00-29.60	24.00-28.80	21.50-29.80	24.50-29.00	19.00-29.80	22.50-29.50
Unsmoked sheet	22.50-27.50	20.50-28.00	20.00-26.50	18.00-27.50	20.50-27.00	22.50-28.00	16.50-28.00	21.00-27.50
Scrap	14.00-21.00	16.50-20.00	17.00-19.00	—	17.00-22.00	18.50-20.00	13.00-20.00	15.00-22.00

Table II.

Mean of Lowest and Highest Rubber Prices Paid by Local Dealers at a number of Centres in each State.

(In Straits dollars per picul (133 1/3 lbs.))

1st Quarter 1938.

	Penang	Perak	Selangor	Negri Sembilan	Pahang	Malacca	Kedah	Johore
				JANUARY				
Smoked sheet	27.17-29.83	26.13-27.97	27.08-29.05	26.04-28.50	25.84-27.66	28.83-30.00	27.62-28.88	26.50-27.95
Unsmoked sheet	26.12-29.09	23.53-25.48	24.25-26.75	24.10-26.70	23.94-25.95	26.50-28.00	25.00-26.75	25.01-26.83
Scrap	16.75-18.75	17.67-19.00	19.50-20.50	—	18.00-20.00	19.83-21.00	19.12-21.75	18.02-19.82
				FEBRUARY				
Smoked sheet	27.17-29.30	26.60-28.59	26.92-28.52	27.50-30.15	26.33-28.57	29.66-30.50	28.00-29.88	26.01-28.15
Unsmoked sheet	26.00-28.57	24.46-26.41	23.70-25.90	24.20-27.20	24.54-26.66	27.17-28.83	25.12-27.62	24.90-27.19
Scrap	16.88-18.50	17.00-22.00	20.75-21.25	—	18.00-21.00	20.83-22.17	18.88-21.50	19.60-20.87
				MARCH				
Smoked sheet	24.83-27.50	24.99-27.44	24.33-26.52	25.44-28.06	23.58-27.77	25.33-27.17	24.12-27.20	25.04-27.36
Unsmoked sheet	23.62-26.75	22.48-25.01	21.83-24.83	24.40-26.16	21.50-25.14	23.83-26.00	18.38-25.00	23.33-25.98
Scrap	15.50-18.00	18.25-19.00	17.50-18.50	—	17.00-22.00	19.00-19.83	15.00-18.50	17.66-19.76

Table III.

Production of Rubber on Small Holdings

(in tons)

	Total Year 1937	1st Quarter 1937	1st Quarter 1938
Federated Malay States	91,134	19,764	17,967
Unfederated Malay States	80,605	19,310	16,749
Straits Settlements	16,730	3,769	3,298
Total ...	188,469	42,843	38,014

Diseases.

Mouldy Rot was little in evidence during the dry months of January and February, but became more prevalent with the wet weather of March. Satisfactory control of the cases encountered was maintained.

Following the cessation of "wintering" several cases of *Oidium Heveae* were reported in most parts of the country, but attacks were generally of a mild nature, except in Penang and Province Wellesley where the disease was widespread and more serious than in previous years. In the latter cases only late-wintering trees were attacked but some of them lost as much as approximately 90 per cent. of their new canopy. A certain amount of the reported damage was done by thrips.

Sporadic outbreaks of Pink Disease were encountered, but in most cases control measures were practised at an early stage.

The two root diseases, *Fomes lignosus* and *Fomes noxius* are still much in evidence in Kinta and Batang Padang, Perak, and in the majority of cases small-holders do not attempt control. Observations on the rate of spread of these diseases were made during March, but in six 1 acre plots no fresh infection had occurred since November.

Slight soil erosion is mentioned in the Pahang report, but serious cases have been encountered in Province Wellesley owing to clean weeding. In Penang frequent visits are necessary to ensure that the advised methods of erosion control are being strictly followed.

General.

Some small-holders are taking an interest in replanting. Four Chinese in Penang have commenced replanting, and others have applied for permission,

Table IV.

Estimated Acreage of Tappable Rubber which was out of Tapping on Holdings of less than 100 Acres at the end of March, 1938.

PERAK				SELANGOR				NEGRI SEMBILAN				PAHANG			
District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage
Batang Padang	36,187	5,800	16	Klang†	16,143	5,600	35	Seremban	23,639	18,900	80	Raub	10,534	4,700	45
Kinta	38,874	3,900	10	Kuala Langat†	23,881	7,600	32	Tampin	21,896	14,900	68	Kuala Lipis	15,457	1,200	8
Kuala Kangsar	92,166	24,900	27	Ulu Langat	45,012	11,300	25	Kuala Pilah	31,832	12,700	40	Bentong	12,224	2,600	21
Upper Perak	15,590	6,700	43	Ulu Selangor	31,493	8,800	28	Jelebu	9,097	1,500	17	Other Districts†	49,373	10,200	22
Larut & Selama	43,132	4,700	11	Kuala Lumpur	20,277	9,700	48	Port Dickson	11,133	9,000	81				
Krian	9,408	7,700	82	Kuala Selangor†	8,417	2,600	31								
Lower Perak*	26,735	6,700	25												
Dindings	9,873	7,300	74												
	271,965	67,700	25		145,193	45,600	31		97,597	57,000	58		84,588	18,700	22

MALACCA				PENANG & P. WELLESLEY				SINGAPORE			
District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage
Central	14,093	6,800	48	North	3,549	2,000	57	Singapore	20,115	2,000	10
Alor Gajah	30,838	3,700	12	Central	10,785	2,800	26				
Jasin	25,286	5,300	21	South	8,936	5,400	60				
				Penang	15,822	900	6				
	70,217	15,800	22		39,092	11,100	28		20,115	2,000	10

JOHORE	359,007	66,500	19
KEDAH	102,126	28,600	28
PERLIS	2,916	22,100	27
KELANTAN & ‡ TRENGGANU	49,133 29,836		

The percentage of areas out of tapping in December, 1937, was as follows:—Perak 13, Selangor 16, Negri Sembilan 46, Pahang 11, Malacca 9, Penang and Province Wellesley 13, Singapore 10, Johore 16, Kedah 11.

* Estimated from percentage for Kuala Kangsar.

†Estimated from percentage for other Districts in the State.

‡Estimated from percentage for rest of Malaya.

Table V.

Comparison of Areas of Rubber Small Holdings Out of Tapping.

	March, 1937		December, 1937		March, 1938	
	Acres	Percentage	Acres	Percentage	Acres	Percentage
F.M.S.	158,900	29.5	114,400	19.1	189,000	31.5
S. S.	28,100	22.7	13,100	10.1	28,900	23.1
U.M.S.	111,600	23.3	74,300	13 9	117,200	21.8
Malaya	298,600	25.7	201,800	16.0	335,100	26.9

including a Malay in Province Wellesley. A certain amount of replanting is also reported from Pahang.

The Krian report states that the preparation of smoked sheet has decreased during the quarter under review, due largely to lack of time, small-holders working in padi fields or on various Government contracts. In some cases, however, the owners say that as they have insufficient money they cannot wait to have their sheets smoked before sale.

Interest in, and the use of, smoke cabinets have not been maintained owing to the present low value of rubber, but in Pahang 55 new cabinets were erected during the quarter, making a total of 221 in the State.

In Perak South a Malay owner of about 500 acres of rubber has built a 40 picul cabinet at a cost of over $1,000. He proposes to smoke the sheet of other small-holders and also has become established as a dealer in direct competition with the ring of Teluk Anson dealers.

A scheme for improving rubber in Batang Padang, Perak, came into force on the 1st February whereby all dealers have to display a board exhibiting samples of five grades of smoked rubber together with the prices which they are willing to pay for each grade. A similar scheme which has been in operation in Pahang for some considerable time continues to work smoothly and provides a valuable guide to quality of production.

Further budgrafting has taken place in Johore, and in the Muar District some 715 trees were budded under the supervision of the Asiatic Rubber Instructor. Despite the prolonged dry spell in February a 56 per cent. success was recorded.

All reports comment on the worsened economic conditions which rubber small-holders are at present experiencing owing to reduced quota and lower market values. As a result, small-holders are turning their attention to other crops and others means of livelihood.

Miscellaneous.

ANNUAL PRIZE DISTRIBUTION, SCHOOL OF AGRICULTURE, MALAYA.

The annual prize distribution at the School of Agriculture, Malaya, was held at Serdang on Thursday morning, April 14th, 1938. In addition to the staff and students there were present the Hon'ble the Federal Secretary (Mr. C. D. Ahearne) and the following members of the School Advisory Committee, Messrs. R. Boyd, H. A. R. Cheeseman, W. E. Wallis, W. A. Stanton, J.P., and the Hon'ble Mr. Cheok Huan Cheong, M.S.C.

The Principal of the School (Mr. G. E. Mann, M.C.) opened the proceedings by regretting that the Adviser on Agriculture was unable to preside owing to indisposition. After welcoming the visitors, Mr. Mann reviewed the progress of the school during the past school year. He recorded that the present school year commenced with a complement of 73 students and pupils, seven short of the maximum capacity. Two Government scholars were allowed to resign and 3 private students were withdrawn during the year, leaving 68. Of these, 24 second year students and 24 one year course pupils were leaving that day on the completion of their training, while indications were that about the same number would be newly admitted when the School reopened in May.

Mr. Mann continued: "There have been no important changes in the purely agricultural side of our training other than the inclusion in the Two Years Course of a series of lectures on Estate Records and Reports, in the preparation of which we received material assistance from the planting members of our Committee. I may also mention in this place our indebtedness to the Federated Engineering Company for supplying a 4-roll hand-sheeting battery at considerably below the usual price. With this machine, we can now demonstrate up-to-date practice in the machining of sheet rubber. I am glad to say that, with the kind assistance of the Controller of Labour who loaned us a really good teacher, the instruction of selected students in colloquial Tamil has improved considerably and may apparently now be regarded as satisfactory. While that has been happening, the F.M.S. scheme for major scholarships has been changed by raising the number of scholarships to eight and by reserving only half instead of all of them for Malays. Further, Government has approved a scheme for the creation of certain continuation scholarships and paid apprenticeships which will enable approved Malay candidates to spend 6 months on the Rubber Research Institute Experiment Station at Sungei Buloh followed by a further 6 months on a selected estate. So, you see, we are now provided with the necessary machinery for turning out a very much better type of Malay estate employee than formerly. Unfortunately, in a sense, we shall not be able to take full advantage of this scheme this year, in that the Rubber Research Institute has recently decided to increase its staff of Asiatic Rubber Instructors and will therefore be taking the pick of those Malay students who are leaving to-day.

This leads me to the question of employment generally. Of the 267 students and pupils who have either passed through this School or are in the School to-day, 153 are known to have obtained employment in one capacity or another. The actual figure is probably higher because some 20 old boys have failed to keep in touch with us. Of the 48 students and pupils leaving to-day, 18 or 19 are already assured of employment, subject of course to their gaining the necessary medical certificates. Three Chinese and one Malay will be entering the Department of Agriculture, S.S. and F.M.S.; eight Malays will be entering the various Agricultural Departments of the Unfederated Malay States and North Borneo, while the Rubber Research Institute is taking at least three Malays as Asiatic Rubber Instructors and two Chinese as laboratory assistants. The total of 18 or

19 appointments includes seven for pupils from the One Year Course, leaving 16 pupils to return to their kampongs and one to resume duty as an Assistant Penghulu in Selangor. The majority of 2nd year students who are leaving without an actual appointment are Chinese, and these will presumably lose little time in finding employment for themselves, like many of their predecessors in the School; but, if they find difficulty in this respect, they can rely on the staff of the School to keep them informed of any vacancies which are known to exist on estates.

We continue to be rather proud of our poultry section at the School and it may interest you to know that, from only 1½ acres of land under chickens, we received $960 from actual sales during 1937, while live birds and eggs for hatching valued at over $300 were distributed free to other departmental poultry stations. All birds are kept in pens and their health has been satisfactory. The staff has dealt with numerous requests for advice, in dealing with which the three advisory leaflets we have had printed were found to be very useful."

After referring to recreation during the past year, and to the publication of the second number of the School Magazine, Mr. Mann thanked the school staff for their keen and loyal support, and particularly thanked Mr. Dawson for the careful and able way he had carried on the duties of Principal during the period of the speaker's absence on leave. He also thanked the staff of the Central Experiment Station for their continued assistance in connexion with the students' field work, and congratulated the students on their continued good spirit and behaviour.

Mr. Mann then called upon Mr. Ahearne to distribute the prizes, diplomas, and certificates which had been awarded in respect of the various courses of training, after which Mr. Ahearne addressed the students.

Mr. Ahearne thanked the Principal for giving him the opportunity of meeting and addressing the students. He regarded the School as one of the most important contributions the Government had made to the welfare of Malaya, and the students as fortunate in the choice of their calling. He referred to the greatness and diversity of agriculture in this country and to the importance of making available the accumulated knowledge regarding the many problems of agriculture, and pointed out how essential it was, therefore, that there should be trained men to make the best of their ancestral lands and to act as advisers to those who do not possess this knowledge. The School, he thought, would have its maximum effect in thus improving agriculture and the position of the agriculturist.

The speaker was of opinion that there would be an increasing demand for locally-qualified men to take part in the management of large-scale agricultural undertakings. The School would provide men with the necessary knowledge but ultimate success or failure would depend on the character and ability of the men themselves.

The Director of Co-operation, F.M.S. and S.S. (Mr. Boyd), proposed a vote of thanks to Mr. Ahearne which was seconded by Mr. Cheeseman, Chief Inspector of English Schools, S.S. and F.M.S., who in the course of his remarks referred to the appreciation felt by the Education Department for the co-operation of the School of Agriculture. He concluded by hoping that the time was not far distant when every village and town school in this Peninsula, not only Vernacular but also English, would have its school-garden, as he felt that they could teach through that medium that which cannot be taught in any other way.

Reviews.

Latex and Rubber Derivatives and their Industrial Applications.

Vols. II and III. By Frederick Marchionna (The Rubber Age, New York) 1670 pp. $20 (gold).

Volume I of this encyclopaedic work, published in 1933, is so well known that the new volumes, constituting a supplement to the original work, will immediately commend themselves without comment to all rubber technologists. The new volumes preserve the highly acceptable format of the original work. The subdivision into chapters follows the same general lines, though the great developments in latex technology in recent years have necessitated the splitting of certain of the original chapters into a number of new ones, and the introduction of new subject headings. The type, the same as that used in the original volume, is notable for its easy legibility—a particularly valuable feature in a work of this kind—while access to any desired item amongst the great mass of material presented is rendered easy by the admirable series of comprehensive indexes.

A new feature which will be greatly appreciated is the supplementing of Mr. Marchionna's own admirable introductory remarks to selected chapters by a series of articles contributed by acknowledged experts in the field concerned. The names of these contributors—Fisher, McGavack, Schidrowitz, Twiss, Szegvari, Beal, Richter and Schur, Sebrell and Morris—speak for themselves. It is doubtless due to the limited space at his disposal that Dr. Fisher's contribution on "The Composition and Structure of the Rubber Hydrocarbon" deals somewhat summarily with subjects which are surely still open to discussion, *viz.* the molecular weight and the geometrical configuration of the rubber hydrocarbon.

Those working on the production side of the industry will naturally regret the curtailment in the new volumes of the chapters dealing with their own aspect of the subject (matter dealing with the production of latex for export now occupies only 146 pages out of a total of 1432 as against 357 out of 886 pages in the original work), but this is doubtless inevitable in view of Mr. Marchionna's declared main purpose of comprehensively surveying the field of the technology of latex and rubber derivatives. For the same reason, much published work which the author regards as being of purely academic interest has been omitted; but the book nevertheless presents an excellent summary of much work of purely scientific import.

Unfortunately, or perhaps one should with respect to a work of this size say inevitably, a considerable number of minor typographical errors have crept in, but no serious blemishes have been detected.

The book is a splendid tribute to Mr. Marchionna's immense industry and to his fine critical faculty, which must have been almost constantly employed over a period of years in the production of this invaluable work.

K. C. R.

A Malayan Bibliography.

By J. H. M. Robson, C.B.E. Privately published. 48 pp. 6th Edition, March, 1938.

In presenting his 6th edition of a classified bibliography of the literature concerning Malaya—to which he appends a list of some books concerning Borneo—Mr. Robson gives to students, and to all those interested in this country, a reference list of great value. Mr. Robson's task has, one feels sure, been a source of great satisfaction to himself, for during his long journalistic career in Malaya he must have felt the need of such a list, while, no doubt, in recent years, when he has withdrawn somewhat from his public activities, his study of Malaya has strengthened his conviction that a bibliography would be of value to himself and to his friends.

In conversation, Mr. Robson has stated that he will be pleased to present a copy of this Bibliography to those sufficently interested to write to him, his address is 1, Mount Road, Kuala Lumpur. We anticipate that many will avail themselves of this offer, and Mr. Robson will, thereby, extend his circle of those who are genuinely interested in the literature of Malaya.

D.H.G.

Tamil Agricultural Journal.

Readers in Malaya are reminded that an agricultural journal in Tamil is published by the Department of Agriculture, three numbers of which have already been issued. The articles contained in these numbers are as follows:—

No. 1 Gingelly, Soil Erosion, Manufacture of Smoked Sheet on Small Holdings, The Quality of Copra, White Ants in Coconuts.

No. 2 Tobacco, Hatching under a Broody Hen, Groundnuts, Dairying.

No. 3 The Preparation of Smoked Sheet on Small Holdings, with a Description of Suitable Forms of Smoke Houses.

Copies of any of these publications will be sent free of charge to any address in Malaya, and the Editor would be pleased to hear from managers of estates and others who desire that copies of future numbers should be regularly supplied for the information of the Tamil labour force.

Departmental.

FROM THE DISTRICTS.

Compiled by the Chief Field Officer from Monthly Reports of Agricultural Officers.

April, 1938.

The Weather.

In Kedah, Province Wellesley and Perak there was very heavy rainfall and the total precipitation was much above average. Floods have been reported from several areas in Province Wellesley and Perak.

The northern parts of Selangor were also abnormally wet, while the rainfall in the south of that State was normal. In Negri Sembilan, Malacca and Johore down to Singapore the weather was cool and cloudy but the rainfall approximated to normal with some local variations. Along the west coast of Johore thunderstorms were of frequent occurrence and rainfall high.

In Kelantan the weather was more than usually hot and dry but the rainfall on the east coast of Pahang was above normal.

Remarks on Crops.

Rubber.—The price of smoked sheet paid by dealers in the rural areas ranged between $18 and $26; the lower prices occurred during the middle of the month. At the end of the month the price rose again to the previous level. The value of export rights varied from $12 to $16 per picul.

The effect of low prices, augmented in many parts of the country by heavy rain, has greatly increased the number of holdings which are out of tapping. Most of the small holdings still in tapping are now being tapped by the owners. Where a labourer is employed to tap he receives as much as half to two-thirds of the crop as wages, (the price of uncouponed rubber is now worth only $6 to $7 per picul). In Province Wellesley some medium-sized estates have closed down and are selling their coupons.

Padi.—Harvest has now practically been completed throughout the country. The few areas which still remain are being reaped with difficulty owing to the frequent rain. In Krian much of the padi is of poor quality; the season's crop is smaller than the previous one whilst the price remains much the same as last season. Middlemen and planters are as usual holding their padi hoping for a rise in price. During the month 35,029 sacks of S.K.48 were sealed, bringing the total up to 70,465. Inspection and sealing appears to be proceeding satisfactorily but definite figures of the amount for which premium has been paid by the Government rice mills is not yet available.

Fruit.—In Perak the demand is maintained for good quality fruit trees, and at present exceeds the supply. The stocks of fruit trees at the Agricultural Stations are being increased. Work on the new fruit Station at Ayer Tawar is proceeding.

The Agricultural Officer, Malacca, reports that following the extensive shooting of squirrels the decrease in the damage done to the fruit crop is already apparent. During the last few months some 17,700 squirrels have been accounted for.

DEPARTMENTAL NOTES.

Meeting of the Advisory Committee, School of Agriculture, Malaya.

A meeting of the Advisory Committee, School of Agriculture, Malaya, was held at the School on 14th April 1938. In the absence of the Adviser on Agriculture, the Principal of the School was voted to the Chair.

Arising from the minutes of the previous meeting, which were confirmed, the Principal described how the teaching of colloquial Tamil had been improved during the past year and might now be considered satisfactory. It was agreed that a more reliable impression should be obtainable in a year's time.

The Annual Report for 1937, having been circulated, was confirmed, and various matters arising therefrom were discussed.

Amongst other matters discussed were the title of Senior Lecturer, assistance to staff during leave of European officers, and the distribution of the School prospectus to Chinese estate owners.

Appointments.

Mr. P. R. Davidson, B.Sc. (Agric.), N.D.A., Agricultural Officer, Uganda, has been appointed to be an Agricultural Officer, Department of Agriculture, Straits Settlements and Federated Malay States, with effect from the 10th February, 1938, inclusive. Mr. Davidson arrived on the 15th March, 1938.

Mr. W. N. Scott, B.Sc., B.Agr., Ph.D., has been appointed to be an Agricultural Officer, Department of Agriculture, Straits Settlements and Federated Malay States, with effect from 11th February, 1938, inclusive. Mr. Scott arrived on the 10th March, 1938.

Mr. T. W. Brown, B.Sc. (Agric.), Ph.D., has been appointed to be an Agricultural Officer, Department of Agriculture, Straits Settlements and Federated Malay States, with effect from 1st March 1938, inclusive.

Transfer.

The policy of engendering and maintaining a close relation between the Field Branch and the Agricultural Division of the Department by the occasional exchange of officers has been approved, and it is expected to prove of benefit to both sections. Further to implement this policy, Mr. J. L. Greig, Agriculturist, has been appointed to officiate as Agricultural Officer, Perak Central, with effect from 18th April 1938.

Leave

Mr. J. Fairweather, Agricultural Officer, returned from leave on 11th February 1938.

Mr. T. D. Marsh, Agriculturist, returned from leave on 14th April 1938.

The leave of absence granted to Mr. C. W. S. Hartley, Agricultural Officer, has been further extended for one month with effect from 6th May 1938, inclusive.

Statistical.

MARKET PRICES.

April, 1938.

Major Crops.

Rubber.—The market recovered from the severe set-back of the previous month, although the opening price of 16 cents was a further fall and was the lowest quotation recorded since 1934. Spot loose opened in Singapore at 16 cents per lb. but immediately improved to 17¾ cents, continuing a steady advance to 21⅜ on the 23rd April. Thereafter the market again weakened and closed at 18½ cents.

The average price for the month of No. 1. X. Rubber Smoked Sheet was 19.26 cents per lb., as compared with 21.74 cents in March. The London average price was 5.77 pence per lb., and the New York price 11.69 cents gold, as compared with 6.69 pence and 14.65 cents gold in the previous month.

Prices paid for small-holders' rubber at three centres during the month are shewn in Table I.

Table I.

Weekly Prices Paid By Local Dealers for Small-Holders' Rubber, April, 1938.

(Dollars per Picul.)

Grades.	Kuala Pilah, Negri Sembilan.				Kuala Kangsar, Perak.		Batu Pahat, Johore.			
	7	14	21	28	13	20	6	13	20	27
Smoked sheet	21.50	24.70	24.10			24.00			22.50	
Unsmoked sheet	20.00	22.00	22.94	22.00	21.36	21.00	16.25	20.50	21.00	19.80
Scrap										

Transport by F.M.S.R. lorry service Kuala Pilah to Seremban 12 cents per picul, to Malacca excluding duty, 25 cents per picul, by rail Seremban to Penang $1.24 per picul, Seremban to Singapore $8.00 per ton.
Transport from Batu Pahat to Singapore by lorry excluding duty, 90 cents per picul.
Transport from Kuala Kangsar to Prai by railway $6.20 per ton.
Transport from Kuala Kangsar to Singapore by railway $10.00 per ton (minimum consignment 5 tons).
At Kuala Pilah the standard deduction for moisture in unsmoked sheet is 5 per cent.
At Kuala Kangsar the standard deduction for moisture in unsmoked sheet is 10 per cent.
No purchases at Kuala Kangsar on the 6th and 27th April.

Palm Oil.—The market fell heavily in the early part of April, but recovered in the second half as shewn in Table II.

Table II.
Prices of Palm Oil and Palm Kernels.

Date 1938.	Palm Oil in Bulk, c.i.f. landed weight Liverpool/ Halifax.	Palm Kernels, c.i.f. landed weight London/ Continent
	per ton	per ton
April 1	£ 14. 0. 0	£ 9. 2. 6
,, 8	12. 15. 0	9. 10. 0
,, 15	13. 10. 0	9. 5. 0
,, 22	14. 2. 6	9. 7. 6
,, 29	14. 0. 0	9. 5. 0

Copra.—After an initial slight fall, the market recovered and maintained a certain improvement throughout the month, still rising at the close to reach $3.80 per picul. The sun-dried grade averaged $3.62 per picul for the month, as compared with $3.68 in March, and the mixed grade continued 40 cents lower.

Copra cake was unchanged at $1. 80 per picul.

Rice.—The average wholesale Singapore prices of rice per picul in March were as follows:—Siam No. 2 (ordinary) $4.09; Rangoon No. 1 $3.62; Saigon No. 1 $3.92; as compared with $4.15, $3.82, and $3.92 in February, and with $4.44, $3.60, and $3.82 in March 1937.

The average retail prices in cents per gantang of No. 2 Siam rice were again unchanged and were:—Singapore 28, Penang 32, Malacca 28.

The average declared trade value of imports during March was $3.89 per picul as compared with $3.85 in February and $4.04 in January.

Padi.—The Government Rice Mills, Perak, continued to pay $2.10 per picul for padi. Retail prices of padi ranged from 6 to 14 cents per gantang.

Pineapples.—Prices per case of canned pineapples continued unchanged at: G.A.Q.: Cubes $2.70, Sliced Flat $2.65, Sliced Tall $2.80; Golden Quality: $2.85, $2.80 and $2.95 respectively.

Prices of fresh fruit per 100 for canning were as follows:— Singapore 45 to 90 cents; Johore, 1st quality 50 to 70 cents, 2nd quality 30 to 55 cents, 3rd quality 20 to 35 cents.

Beverages.

Tea.—Ten consignments of Malayan tea were sold on the London Market during April, three upland and seven of lowland tea. The upland tea averaged 1s. 2½d., 1s. 2¾d. and 1s. 3¼d. per lb., and the average prices of the lowland tea ranged from 1s. 0d. to 1s. 1¾d. per lb.

Average London prices per lb. during April for consignments of tea from other countries were as follows:— Ceylon 1s. 4.17d., Java 1s. 2.56d., Indian Northern 1s. 2.04d., Indian Southern 1s. 3.81d., Sumatra 11.68d.

The latest Colombo average prices available, quoted from *The Weekly Tea Market Report,* 26th April, 1938, of the Colombo Broker's Association, are as follows, in rupee cents per lb.: High Grown Teas 75 cents, Medium Grown Teas 66 cents, Low Grown Teas 62 cents.

Coffee.—Sourabaya and Palembang coffee improved slightly during April. Sourabaya averaged $11.88 to $12.94 per picul and Palembang $8.44 to $9.44, as compared with $10.95 to $11.75 and $7 to $8 respectively in March.

Prices in Singapore of other varieties of coffee were as follows (per picul):— Liberian $14; Excelsa $9.50, closing at $10; Robusta $6.50, falling to $6 at the close.

Arecanuts.—The range of Singapore prices per picul during the month was as follows:— Splits $4.24 to $7.12; Red Whole $4.50 to $5.62; Sliced $5.50 to $9.62.

The averages of the Singapore Chamber of Commerce quotations per picul were:—Best $7.45, Medium $6.95, Mixed $6.50.

Pepper.—The market was stagnant and prices remained at the following levels throughout the month:—Singapore Black $8.25, Singapore White $13.75, Muntok White $14 per picul. The March averages were $8.75, $14.56 and $15.06 per picul respectively.

Nutmegs.—The price of both 110's and 80's was $32 per picul throughout the month, falling at the close to $31, with an average of $31.80 as compared with $30.50 in March.

Mace.—Prices continued unchanged throughout the month at: Siouw $90, Amboina $75 per picul.

Cloves.—Zanzibar and Amboina continued unchanged at $40 per picul (nominal).

Cardamoms.—Green cardamoms were quoted in the Ceylon Chamber of Commerce reports for April at Rs. 1.25-Rs. 1.37 rising to Rs. 1.35-Rs. 1.44 at the close.

Miscellaneous.

Derris (Tuba Root).—There was a slight increase of $1 per picul in values of derris roots. Roots sold on rotenone content averaged $25 per picul, and on a basis of ether extract $15 per picul. Another source quotes $16 on a basis of ether extract (15 per cent.).

Gambier.—Block was quoted throughout the month at $7 per picul, and No. 1 Cube $15.50 per picul. The March average prices were $7.38 and $15.88 per picul respectively.

Tapioca.—Flake Fair continued unchanged at $4.25 per picul. Seed Pearl was quoted throughout at $4.40, falling to $4.25 at the close, with an average of $4.37. Medium Pearl was quoted throughout at $5 per picul.

Sago.—Prices weakened in April. Pearl, Small Fair, averaged $3.87 per picul. Flour, Sarawak Fair, $2.19, as compared with $4.06 and $2.37 in March.

Tobacco.—The general range of prices per picul for dried leaf was as follows:—1st quality $25 to $45; 2nd quality $20 to $35; 3rd quality $10 to $30. Prepared tobacco prices were:—Kelantan 1st quality $110, 2nd quality $85, 3rd quality $65; Negri Sembilan $58, $48, and $15 to $38. Java tobacco in Johore was sold at $40 to $95 per picul.

The above prices are based on London and Singapore daily quotations for rubber; on the Singapore Chamber of Commerce Weekly Reports for the month and on other local sources of information. Palm oil reports and certain coffee prices are kindly supplied by Messrs. Guthrie & Co. Ltd., Kuala Lumpur; the Singapore prices for imported coffee and arecanuts by the Lianqui Trading Company of Singapore, and derris prices by Messrs. Kohyei & Co., and Messrs. Hooglandt & Co., Singapore.

1 picul = 133⅓ lbs. The Dollar is fixed at two shillings and fourpence.

Note.—The Department of Agriculture will be pleased to assist planters in finding a market for agricultural produce. Similar assistance is also offered by the Malayan Information Agency, 57 Trafalgar Square, London, W.C. 2.

GENERAL RICE SUMMARY*

March 1938.

Malaya.—Imports of foreign rice during March were 70,172 tons† and exports 16,371 tons, net imports being 53,801 tons as compared with 32,236 tons in 1937¶.

Of the March imports 44 per cent. were consigned to Singapore, 23 per cent. to Penang, 5 per cent. to Malacca, 19 per cent. to the Federated Malay States, and 9 per cent. to the Unfederated Malay States. The foreign imports by countries of origin were as follows (in tons, percentages in brackets): Siam 41,844 (59.6), Burma 26,009 (37.1), French Indo-China 1,337 (1.9), other countries 982 (1.4).

Of the exports during March 76 per cent. were consigned to the Netherlands Indies and 24 per cent. to other countries. The various kinds of rice exported were as follows (in tons, percentages in brackets):—Siam 11,568 (70.7), Burma 4,149 (25.3), French Indo-China 459 (2.8), parboiled 61 (0.4), local production 134 (0.8).

India and Burma.—Exports from India in January and February totalled 36,000 tons as compared with 285,000 tons in 1937, a decrease of 87.4 per cent. Of these, 5.6 (3.8) per cent. were to the United Kingdom, 5.6 (5.3) per cent. to the Continent of Europe, 44.4 (32.3) per cent. to Ceylon, 5.5 (29.1) per cent. to the Straits Settlements and the Far East, and 38.9 (29.5) per cent. to other countries. The figures in brackets are for 1937.

Burma's exports from the 1st January to 23rd March totalled 855,223 tons as compared with 836,070 tons in 1937, an increase of 2.3 per cent. Of these, 45.7 (47.7) per cent. were to India, 9.8 (9.6) per cent. to the United Kingdom, 5.7 (2.1) per cent. to the Continent, 12.9 (13.1) per cent. to Ceylon, 14.6 (14.3) per cent. to the Straits Settlements and the Far East, and 11.3 (13.2) per cent. to other countries. The figures in brackets are for 1937.

Siam.—Exports of rice and rice products from Bankok during January were 113,954 tons as compared with 91,991 tons in 1937.

Japan.—The latest information available was published in the February Summary.

French Indo-China.—Entries of padi into Cholon during the first three months of the year totalled 412,694 tons as compared with 438,339 tons in 1937, a decrease of 5.9 per cent. Exports of rice during the same period were 405,519 tons, an increase of 2.5 per cent. when compared with the previous year.

Ceylon.—Imports of rice during the first quarter of 1938 aggregated 147,320 tons as compared with 142,612 in 1937, an increase of 3.3 per cent. Of these imports 14.4 (16.2) per cent. were from British India, 74.0 (72.0) per cent. from Burma, 0.7 (0.2) per cent. from the Straits Settlements, and 10.9 (11.6) per cent. from other countries. The percentages in brackets are for 1937.

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* Abridged from the Rice Summary for March 1938 compiled by the Department of Statistics, Straits Settlements and Federated Malay States.

† Ton = long ton (2,240 lbs.)

¶ It is to be understood throughout the summary that all comparisons and percentage increases or decreases are in relation to the corresponding period of 1937.

Europe and America.—Shipments from the East to Europe from the 1st January to the 3rd March totalled 111,844 tons as compared with 159,414 tons in 1937, a decrease of 29.8 per cent. Of these shipments, 40.3 (41.7) per cent. were from Burma, 44.5 (40.2) per cent. from Saigon, 13.5 (13.4) per cent. from Siam, and 1.7 (4.7) per cent. from Bengal. The figures in brackets are the corresponding percentages for 1937.

FERTILIZER PRICES, APRIL, 1938.

The following are the prices at the end of April, 1938, of some of the more important fertilizers.

Product.	Analysis				Price per ton $
	Nitrogen (N)	Phosphoric Acid (P_2O_5)		Potash (K_2O)	
		Soluble	Insoluble		
Sulphate of Ammonia ...	20	—	—	—	72.75
Calcium Cyanamide ...	20.6	—	—	—	80.00
Muriate of Potash ...	—	—	—	50	112.00
Sulphate of Potash ...	—	—	—	48	112.00
Superphosphate (concentrated) ...	—	39 - 40	—	—	105.00
Superphosphate ...	—	16 - 18	—	—	60.00
Basic Slag ...	—	16	—	—	48.00
Rock Phosphate (Christmas Island) ...	—	11*	38‡	—	33.50
Rock Phosphate (very finely ground Gafsa) ...	—	11*	26 - 28‡	—	40.00
Lime ...	—	—	—	—	20.00

* Citric soluble. ‡ Total.

Quotation for sulphate of potash *ex* warehouse, Port Swettenham, F.M.S. or Singapore. All other quotations are *ex* warehouse Port Swettenham, Klang or Singapore.

MALAYAN AGRICULTURAL EXPORTS, MARCH, 1938.

PRODUCT.	Net Exports in Tons				
	Year 1937	Jan./Mar. 1937	Jan./Mar. 1938	March 1937	March 1938
Arecanuts ...	30,084	8,516	11,331	3,190	4,450
Coconuts fresh † ...	95,223†	17,732†	22,745†	6,291†	10,734†
Coconut oil ...	39,762	8,454	11,505	2,490	4,613
Copra ...	75,592	16,124	10,140	8,089	3,403
Gambier, all kinds ...	1,955	524	425	186	180
Copra cake ...	15,026§	3,617§	1,603	1,333§	920
Palm kernels ...	7,312	1,570	2,176	539	1,005
Palm oil ...	42,787	9,135	12,950	3,573	5,691
Pineapples canned ...	80,502	19,071	20,211	6,781	8,767
Rubber ¶ ...	503,127¶	113,111¶	108,455¶	38,443¶	35,972¶
Sago,—flour ...	15,478	6,791	2,520	3,760	2,014
,, —pearl ...	3,759	881	962	250	328
,, —raw ...	8,256*	1,935*	1,710*	756*	555*
Tapioca,—flake ...	1,058	323	246	92	54
,, —flour ...	2,393*	501*	858*	67*	252*
,, —pearl ...	18,786	3,703	4,070	1,059	1,924
Tuba root ...	573	176	80	36	27

† hundreds in number. * net imports. ¶ production. § gross exports.

MALAYAN PRODUCTION OF PALM OIL AND KERNELS

(In long tons, as declared by Estates)

Month 1938	Palm Oil		Palm Kernels	
	F.M.S.	U.M.S.	F.M.S.	U.M.S.
January	2,241.7	1,309.2	383.7	232.0
February	2,040.4	1,457.1	370.4	261.0
March ...	2,359.6	1,843.1	446.8	344.0
Total	6,641.7	4,609.4	1,200.9	837.0
Total Jan. to March, 1937 ...	5,542.8	4,190.2	1,042.7	720.8
Total for the year 1937 ...	27,733.5	17,932.8	5,094.7	2,811.4

Stocks on estates as at 31st March, 1938 were: palm oil 3,639 tons, palm kernels 691 tons.

MALAYAN RUBBER STATISTICS

Acreages of Tappable Rubber actually Tapped and not Tapped on Estates of 100 Acres and over, for the Month ending 31st March, 1938.

State or Territory	Estimated Acreages of Tappable Rubber	Actual area tapped during the month Acreage	Percentage of (3) to (2)	Acreages of tappable rubber not tapped: Estates which have entirely ceased tapping — Acreage	Percentage of (5) to (2)	On estates which have partly ceased tapping: Otherwise than under rotational systems — Acreage	Percentage of (7) to (2)	Under rotational systems — Acreage	Percentage of (9) to (2)	Area of Tappable Rubber never been tapped — Acreage	Percentage of (11) to (2)	Total area not tapped (5) + (7) + (9)	Percentage of (13) to (2)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
S. S.—													
Province Wellesley ...	43,512	21,654	49.8	1,756	4.0	11,414	26.2	8,688	20.0	397	0.9	21,858	50.2
Malacca ...	122,271	73,069	59.8	2,141	1.8	15,217	12.4	31,844	26.0	2,063	1.7	49,202	40.2
Penang ...	2,501	1,382	55.3	331	13.2	728	29.1	60	2.4	36	1.4	1,119	44.7
Singapore ...	32,585	19,608	60.2	1,962	6.0	6,277	19.3	4,738	14.5	185	0.6	12,977	39.8
Total S.S. ...	200,869	115,713	57.6	6,190	3.1	33,636	16.7	45,330	22.6	2,681	1.3	85,156	42.4
F. M. S.—													
Perak ...	288,544	184,095	63.8	6,357	2.2	44,928	15.6	53,164	18.4	7,476	2.6	104,449	36.2
Selangor ...	328,573	227,396	69.2	3,827	1.2	37,043	11.3	60,307	18.3	6,648	2.0	101,177	30.8
Negri Sembilan ...	255,778	167,773	65.6	6,204	2.4	31,488	12.3	50,313	19.7	8,090	3.2	88,005	34.4
Pahang ...	85,870	56,297	65.6	2,924	3.4	16,991	19.8	9,658	11.2	7,012	8.2	29,573	34.4
Total F.M.S. ...	958,765	635,561	66.3	19,312	2.0	130,450	13.6	173,442	18.1	29,226	3.0	323,204	33.7
U. M. S.—													
Johore ...	475,258	333,398	70.2	6,114	1.3	64,500	13.5	71,246	15.0	33,659	7.1	141,860	29.8
Kedah ...	198,575	138,959	70.0	5,564	2.8	17,124	8.6	36,928	18.6	7,095	3.6	59,616	30.0
Kelantan ...	31,220	21,320	68.3	243	0.8	5,702	18.2	3,955	12.7	2,615	8.4	9,900	31.7
Trengganu (*b*) ...	4,817	3,178	66.0	nil	nil	74	1.5	1,565	32.5	74	1.5	1,639	34.0
Perlis (*c*) ...	1,371	858	62.6	216	15.8	257	18.7	40	2.9	84	6.1	513	37.4
Brunei ...	5,417	3,092	57.1	nil	nil	1,441	26.6	884	16.3	556	10.3	2,325	42.9
Total U.M.S. ...	716,658	500,805	69.9	12,137	1.7	89,098	12.4	114,618	16.0	44,083	6.2	215,853	30.1
Total Malaya ...	1,876,292	1,252,079	66.7	37,639	2.0	253,184	13.5	333,390	17.8	75,990	4.1	624,213	33.3

Notes:—(*a*) The acreage shown in column (11) is included in columns (5) and (7).
(*b*) Registered companies only.
(*c*) Rendered quarterly.

MALAYAN RUBBER STATISTICS — TABLE I

STOCKS, PRODUCTION, IMPORTS AND EXPORTS OF RUBBER, INCLUDING LATEX, CONCENTRATED LATEX AND REVERTEX

FOR THE MONTH OF MARCH, 1938 IN DRY TONS.

State or Territory	Stocks at beginning of month 1			Production by Estates of 100 acres and over		Production by Estates of less than 100 acres estimated 2		Imports				Exports including re-exports				Stocks at end of month			Consumption 3	
								during the month		January to March, 1938		during the month		January to March, 1938						
	Ports	Dealers	Estates of 100 acres and over	during the month	Jan. to Mar. 1938	during the month	Jan. to Mar. 1938	Foreign	From Malay States & Labuan	Foreign	From Malay States & Labuan	Foreign	Local	Foreign	Local	Ports	Dealers	Estates of 100 acres and over	during the month	Jan. to Mar. 1938
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
MALAY STATES :—																				
Federated Malay States ...	...	10,733	15,026	10,562	36,580	6,358	17,967	Nil	Nil	Nil	Nil	13,414	4,414	39,812	13,000	...	10,528	14,310	13	44
Johore ...	...	3,208	5,785	5,122	16,824	5,320	10,964	Nil	24	Nil	85	3,663	5,704	9,989	17,426	...	4,703	5,389	...	...
Kedah ...	...	377	3,984	2,575	9,229	767	2,926	Nil	Nil	Nil	Nil	2,000	1,760	6,203	6,138	...	298	3,645	...	...
Perlis ...	...	13	24	15	44	17	68	Nil	Nil	Nil	Nil	Nil	34	Nil	102	...	12	23	...	...
Kelantan ...	...	744	351	296	1,074	899	2,102	Nil	Nil	Nil	Nil	317	710	721	2,278	...	1,035	228	...	...
Trengganu ...	...	55	50	411	921	206	461	Nil	Nil	Nil	Nil	Nil	617	Nil	1,382	...	55	50	...	...
Brunei ...	...	18	71	46	162	97	228	...	...	...	...	...	163	...	396	...	Nil	69	...	...
Total Malay States	...	15,148	25,291	19,027	64,834	13,664	34,716	Nil	24	Nil	85	19,394	13,402	56,725	40,722	...	16,631	23,714	13	44
S. SETTLEMENTS :—																				
Malacca ...	...	2,465	1,299	1,054	3,711	1,029	1,936	Nil		Nil		3,244		7,730		...	2,444	1,433	...	...
Province Wellesley	...	2,641	822	309	1,323	325	743	Nil		Nil		5,781		24,918		...	3,244	727	...	...
Penang ...	2,215	6,182	10	17	64	201	334	2,102	13,540	7,232	42,213		Nil		Nil	2,817	6,212	10	...	...
Singapore ...	6,604	31,259	268	162	509	153	235	13,673		37,383		20,778		56,709		9,058	32,727	226	26	73
Labuan ...	...	46	Nil	Nil	Nil	31	50	38		150		Nil		Nil		...	44	Nil	...	...
Total Straits Settlements ...	8,819	42,593	2,399	1,542	5,607	1,739	3,298	15,813	13,540	44,765	42,213	29,803	Nil	89,357	Nil	11,875	44,671	2,396	26	73
Total Malaya ...	8,819	57,741	27,590	20,569	70,441	15,403	38,014	15,813	13,564	44,765	42,208	49,197	13,402	146,082	40,722	11,875	61,302	26,110	39	117

TABLE II
DEALERS' STOCKS, IN DRY TONS 3

Class of Rubber	Federated Malay States	S'pore	Penang	Province We'sly D'dings M'cca.	Johore	Kedah
22	23	24	25	26	27	28
DRY RUBBER	9,777	31,595	6,066	5,408	3,815	157
WET RUBBER	751	1,132	146	324	888	141
TOTAL ...	10,528	32,727	6,212	5,732	4,703	298

TABLE III
FOREIGN EXPORTS

PORTS	For month	Jan. to Mar. 1938
29	30	31
Singapore ...	34,390	96,152
Penang ...	9,467	36,248
Port Swettenham.	5,165	13,190
Malacca ...	175	492
MALAYA ...	49,197	146,082

TABLE IV
DOMESTIC EXPORTS 4

AREA	For month	Jan. to Mar. 1938
32	33	34
Malay States ...	32,728	95,185
Straits Settlements	2,653	8,360
MALAYA ...	35,381	105,545

Notes :—

1. Stocks on estates of less than 100 acres and stocks in transit on rail, road or local steamer are not ascertained
2. The production of estates of less than 100 acres is estimated from the formula : Production + Imports + Stocks at beginning of month = Exports + Stocks at end of month. + Consumption, *i.e.*, Column [7] = Columns [13] + [14] + [17] + [18] + [19] + [20] − [2] − [3] − [4] − [5] − [9] − [10]. For the Straits Settlements the production of estates of less than 100 acres is represented by sales or exports as shown by cess paid.
3. Dealers' stocks in the Federated Malay States are reduced to dry weights by the following fixed ratios: unsmoked sheet, 15% wet sheet, 25% scrap, lump, etc., 40%; stocks elsewhere are in dry weights as reported by the dealers themselves.
4. Columns (33) and (34) represent exports of rubber subject to regulation which, for Singapore and Penang Islands are represented by sales or exports as shown by cess paid.
5. All statements are brought up to date monthly, and any inaccuracies that may be disclosed are corrected in the totals; the latest publication therefore, is always the most reliable.
6. The above, with certain omissions, is the Report published by the Registrar-General of Statistics, S.S and F.M.S., at Singapore on 23rd April, 1938

METEOROLOGICAL SUMMARY, MALAYA, MARCH, 1938.

Locality.	Air Temperature in degrees Fahrenheit							Earth Temperature		Rainfall								Bright Sunshine.		
	Means of			Absolute Extremes						Total.		Most in a day.	Number of days.					Total.	Daily Mean.	Per cent.
	A. Max.	B. Min.	Mean of A and B	Highest Max.	Lowest Min.	Lowest Max.	Highest Min.	At 1 foot	At 4 feet			Amt.	Precipitation .01 in or more	Precipitation .04 in or more	Thunder-storm	Fog morning obs.	Gale force 8 or more			
	°F	°F	°F	°F	°F	°F	°F	°F	°F	in.	mm.	in.						hrs.	hrs.	
Railway Hill, Kuala Lumpur, Selangor ...	90.8	72.5	81.7	95	70	80	74	84.2	85.1	8.87	225.3	2.86	20	17	7	4		157.80	5.09	42
Bukit Jeram, Selangor ...	88.3	72.9	80.6	91	71	80	75	84.7	86.9	10.28	261.1	3.52	18	12	3			196.95	6.35	52
Sitiawan, Perak ...	89.2	73.8	81.5	92	72	84	77	84.5	84.8	5.18	131.6	1.29	20	15	3			204.00	6.58	55
Ipoh Aerodrome, Perak ...	90.3	72.8	81.5	94	69	82	75	83.4	84.3	10.43	264.9	2.38	15	14	8			170.55	5.50	46
Temerloh, Pahang ...	89.4	73.1	81.3	95	71	79	75	86.4	86.5	7.86	199.6	1.47	18	15	4	3		176.65	5.70	47
Kuala Lipis, Pahang ...	89.0	71.9	80.5	93	70	75	74	84.1	84.5	9.71	246.6	1.79	23	20	8	16		171.10	5.52	46
Kuala Pahang, Pahang ...	85.9	74.5	80.2	88	71	80	78	85.7	86.4	14.72	373.9	4.12	21	17	3			230.30	7.43	61
Kallang Aerodrome, S'pore ...	85.6	75.1	80.3	91	73	79	77	82.3	83.2	7.60	193.0	1.58	16	13	1			130.70	4.22	35
Bayan Lepas Aerodrome Penang ...	87.7	74.6	81.1	91	72	82	78	84.3	84.8	6.91	175.5	2.23	21	13	3			196.30	6.33	53
Bukit China, Malacca ...	86.2	73.9	80.1	91	72	83	76	84.4	85.5	10.00	254.0	3.29	17	14	7		1	188.80	6.09	50
Kluang, Johore ...	88.3	71.9	80.1	94	70	81	74	81.6	82.3	10.76	273.3	1.43	25	23	10	5		134.80	4.35	36
Bukit Lalang, Mersing, Johore	84.9	72.1	78.5	87	70	77	75	81.8	81.4	8.88	225.5	1.62	21	17	1			192.95	6.22	51
Alor Star, Kedah ...	89.8	73.0	81.4	95	70	80	75	84.6	85.9	6.57	166.9	1.74	22	18	3	1	2	195.40	6.30	52
Kota Bahru, Kelantan ...	87.8	72.7	80.3	92	69	76	75	83.1	83.7	19.46	494.3	7.30	17	14	2	1		219.20	7.07	59
Kuala Trengganu, Trengganu	86.2	72.9	79.5	90	70	77	75	83.0	83.6	21.41	543.8	11.17	15	14	1	1	1	240.45	7.76	64
HILL STATIONS.																				
Fraser's Hill, Pahang 4268 ft.	72.9	62.5	67.7	79	60	64	64	71.7	71.9	12.48	317.0	4.07	29	25	5	22	1	117.75	3.80	31
Cameron Highlands, Tanah Rata, Pahang 4750 ft. ...	73.1	56.5	64.8	76	49	66	63	69.7	69.7	10.98	278.9	1.74	27	24	3		1	128.05	4.13	34
Cameron Highlands, Rhododendron Hill, Pahang 5120 ft. ...	72.8	59.4	66.1	77	53	68	62			10.31	261.9	1.88	27	24			1	145.15	4.68	39

Compiled from Returns supplied by the Meteorological Branch, Mala-